Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

SOME NOTES ON NOVA AQUILAE III, 1918

BY E. E. BARNARD

I have kept a close watch on *Nova Aquilae* for changes in light and in its physical appearance. A few of my notes may be of interest in connection with the nebulosity found to be receding from the nova by Aitken and Moore. I can give here only a brief reference to these notes, which are very full and which ought to be printed entire later on. I have already referred to the peculiarities of the brightness of this star (*Astrophysical Journal*, **49**, 199, 1919), as seen in telescopes of different sizes, where it was shown that the nova appeared relatively brighter in small telescopes, due mainly to the fact that in such an instrument all the light went to form the image, while in a larger telescope part of it went to form the optical glow about the true image. This feature was very striking and should be taken into account in any investigation of its brightness.

In the latter part of 1918 the star assumed a perfect planetary disk. This was not simply a large ill-defined image, which it had later on, but a disk as sharply defined and clear cut as the disk of *Neptune*, which it very much resembled, and of a uniform light. This is what I have referred to as "a planetary disk." This disk was measurable and seemed to be expanding. The apparent increase of diameter was about 1″ from October 5th to December 17, 1918. The low altitude of the star made measures somewhat difficult, but I think the increase in size was real. This disk, which was at the normal focus, was of a pale whitish yellow color, and was imbedded in a close yellowish halo. Out of focus (9mm. outside the regular focus) the nova presented the usual crimson image due to the Hα line which always is present at a certain stage in the decline of the novae. This was well defined and small and was surrounded by a greenish white halo.

In the spring of 1919, when *Nova Aquilae* again became observable, it presented a very beautiful appearance in the large telescope. The crimson out-of-focus image had disappeared and the star was a beautiful light blue. Tho the image was not stellar it was not the sharply defined planetary disk previously seen. There was no particle of red about the star, in focus or out. Out of focus it presented a large, rather broken, light blue disk with no special condensation or central core. Later, in May and June, the focal image was bluish white, closely surrounded with a beautiful blue color.

The disk was large but not planetary. The out-of-focus image was all blue with an ill-defined dark blue core. When best seen the star was almost a robin's egg blue.

On 1919, June 5th, the image was large, white and ill-defined and was placed in a very close blue atmosphere. Rough diameter 1″.4. With power of 700 it was whitish or whitish yellow with but little blue about it.

In the last of June the image was perhaps entirely stellar—no longer large or planetary—with a bluish glow close about it. It gave the impression of a white star seen through a blue envelope, which in poor seeing made the entire image a strong blue. The diameter was 3″.7 in a larger, fainter glow 24″ in diameter. The central image was pale blue. "It looked as if there might be a small nebulosity very close preceding and following."

September 23d. Greenish blue. In best focus it was a pale, whitish, ill-defined image, perhaps stellar. It was involved in a greenish blue atmosphere that fitted close about it as if the star were white and had a greenish blue envelope surrounding it. The diameter of this envelope was 2″.0. Later, with very bad seeing, it appeared like a small greenish blue ball 4″.2 in diameter, due to the mingling of the light of the star and the envelope.

On September 27th it was a small whitish stellar point in a greenish blue halo 5″-6″ in diameter. The out-of-focus image was large, irregular, and bluish white with no central core. In focus the image was perfectly stellar and whitish. The bluish glow surrounding it was shifted with respect to the star by looking in at the side of the eye-piece. It was therefore optical. With 700 diameters the star was a very small white stellar point in a greenish blue glow whose diameter was 3″.7.

November 22nd. Bluish. A little whiter in the middle. The out-of-focus image was bluish with no central condensation. Bad seeing.

December 2d. Intensely blue but blurred from bad seeing. Out-of-focus image blue with no central core.

In bad seeing the image was mixed up with the bluish glow about it and this produced an ill-defined very blue image of the star, while in good definition the true image was more white than blue.

The phenomena during the present season so far have been of a slightly different nature.

On 1920, May 13th, the nova was bluish white—almost white—involved in a very close dense nebulosity which was further surrounded by a larger and much fainter glow. The star BD $+0^\circ 4023$, $5'$ south preceding the nova, did not show this appearance of dense nebulosity. The glow in which the nova was imbedded gave it the appearance of a small stellar nebula.

On May 20th the dense glow about the nova did not seem to have much of the blue color. It seemed to become denser later on in the season as the star became slightly fainter.

On June 5th the nova was whitish with a slight bluish tinge. It very much resembled Miss Mackie's *Nova Ophiuchi* ($\alpha 18^h 10^m$, $\delta + 11\frac{1}{2}^\circ$) except that there was slightly more blue to *Nova Aquilae*. It resembled a small bright nebula, while the BD star south preceding was free from this nebulous appearance.

On June 10th it was perfectly stellar, whitish or possibly slightly yellow in color. It was imbedded in a close nebulous glow $3''.2$ in diameter with a fainter glow $30''$ in diameter. The star presented the same appearance it had shown for a long time. A sketch compared with that of May 13th showed the same appearance, so that the nova had apparently not changed for several months.

On June 12th it looked like a small bright stellar nebula. The focus of the stellar image was the same as that for the BD star. It was imbedded in this close bright glow whose diameter was $3''.4$.

On June 26th it was stellar and involved in a close bluish white nebulosity.

On July 8th, with good seeing, it was perfectly stellar, closely surrounded with a bluish white glow. There was no special color to the out-of-focus image, which had no central core. With the eyepiece thus out of focus the BD star $5'$ south preceding had a reddish ill-defined core. In focus this star was slightly yellowish. There was no difference in focus between the nova and this star. The diameter of the glow about the nova was $3''.7$.

These are only a few of my many notes pertaining to the nova. The diminution of brightness has been slow of late.

Following are the magnitudes with the 4-inch finder of the 40-inch telescope since June 5th. They are on the Harvard scale.

	M		M
June 5	8.4	June 24	8.5
June 8	8.4	June 26	8.3
June 10	8.5	June 29	8.5
June 12	8.3	July 3	8.5
June 15	8.4	July 7	8.4
June 17	8.4	July 8	8.5
June 22	8.4		

As will be seen, the star has been essentially constant in its light for over a month. The slight apparent fluctuations are probably not real. Comparisons with BD + 0°4023 in the 40-inch telescope made the nova, at the same times, nearly one magnitude fainter than the above values.

Recent photographs with the 6-inch and 10-inch Bruce lenses differ in the appearance of the nova. With the 6-inch the image is soft and hazy and quite different from the images of neighboring stars. With the 10-inch this peculiarity is not present.

Yerkes Observatory,
Williams Bay, Wisconsin.
1920, July 10.